UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

NMFS Tracking
No.: 2003/00638

July 22, 2004

Thomas F. Mueller
Chief Regulatory Branch
Department of the Army
Seattle District Corps of Engineers
P.O. Box 3755
Seattle, Washington 98124-3755

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Lake Entiat Estates Marina Project, Douglas County, Washington (HUC 170500100201, Johnson Creek and COE No: 200301010).

Dear Mr. Mueller:

Enclosed is a document containing a biological opinion (Opinion) prepared by NOAA's National Marine Fisheries Service (NOAA Fisheries) pursuant to section 7 of the Endangered Species Act (ESA) on the effects of the proposed Lake Entiat Estates Marina Project, Douglas County, Washington. In this Opinion, NOAA Fisheries concludes that the proposed action is not likely to jeopardize the continued existence of ESA-listed Upper Columbia River (UCR) Spring-run Chinook salmon (*Oncorhynchus tshawytscha*) and Upper Columbia River Steelhead (*O. mykiss*). As required by section 7 of the ESA, NOAA Fisheries includes reasonable and prudent measures with nondiscretionary terms and conditions that NOAA Fisheries believes are necessary to minimize the impact of incidental take associated with this action.

This document also contains a consultation on Essential Fish Habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and its implementing regulations (50 CFR Part 600). NOAA Fisheries concludes that the proposed action may adversely affect designated EFH for chinook and coho salmon. As required by
section 305(b)(4)(A) of the MSA, included are conservation recommendations that NOAA Fisheries believes will avoid, minimize, mitigate, or otherwise offset adverse effects on EFH

resulting from the proposed action. As described in the enclosed consultation, 305(b)(4)(B) of the MSA requires that a Federal action agency must provide a detailed response in writing within 30 days of receiving an EFH conservation recommendation.

If you have any questions, please contact Justin Yeager of the Washington State Habitat Office at (509) 925-2618 or email at justin.yeager@noaa.gov.

Sincerely,

D. Robert Lohn
Regional Administrator

Enclosure

cc: Debbie Knaub, COE

Endangered Species Act Section 7 Consultation
Biological Opinion
and
Magnuson-Stevens Fishery Conservation and Management Act
Essential Fish Habitat Consultation

Lake Entiat Estates Marina Project
Upper Columbia River Spring-run Chinook Salmon
Upper Columbia River Steelhead
Sixth Field HUC Johnson Creek - 170200100201
Douglas County, Washington

Lead Action Agency:	United States Army Corps of Engineers
U.S. Army Corps of Engineers No.:	200100764 and 200301010
Consultation Conducted By:	National Marine Fisheries Service Northwest Region
Date Issued:	July 22, 2004
Issued by:	Russell M Strach for D. Robert Lohn Regional Administrator
NMFS Tracking No.:	2003/00638

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1.0 INTRODUCTION

The Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531-1544), as amended, establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat on which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with NOAA's National Marine Fisheries Service (NOAA Fisheries) and the United States Fish and Wildlife Service (USFWS) (together "the Services"), as appropriate, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species. This biological opinion (Opinion) is the product of an interagency consultation pursuant to section 7(a)(2) of the ESA and implementing regulations 50 CFR 402.

The analysis also fulfills the Essential Fish Habitat (EFH) requirements under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) as amended (16 U.S.C. 1801 *et seq.*). The MSA established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan. Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (section 305(b)(2)).

The United States Army Corps of Engineers (COE) proposes to issues a permit to construct three overwater structures, extend a boat launch, and dredge three basins. The COE is proposing the action according to its authority under section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) and section 404 of the Clean Water Act (33 U.S.C. 1344).

1.1 Background and Consultation History

On May 22, 2003 NOAA Fisheries received a biological evaluation (BE), three addenda dated October 21, 2002, February 13, 2003, April 2, 2003, and an EFH assessment for the Lake Entiat Estates Marina Project. On July 8, 2003 NOAA Fisheries sent a letter to the COE requesting additional information. On August 28, September 26, October 20 and 22, and November 11, 14, and 24 more information was received by NOAA Fisheries and formal consultation was initiated on November 24, 2003. Substantial clarifications and additional information were also received on December 9, 2003, January 12, March 8, and April 2, 2004. In addition, NOAA Fisheries attended a site visit and meeting on August 8, 2003. On March 16, 2004 NOAA Fisheries requested an extension of time for formal consultation and was granted an extension till June 5, 2004. The consultation also included numerous telephone conversations, meetings, electronic mail, and faxes between NOAA Fisheries staff, the applicant, the USFWS, the Washington State Department of Wildlife (WDFW) and the COE, these are included in the administrative record on file at NOAA Fisheries Washington State Habitat Office in Lacey, Washington.

1.2 Proposed Action

Proposed actions are defined in the Services' consultation regulations (50 CFR 402.02) as "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas." Additionally, U.S. Code (16 U.S.C. 1855(b)(2)) further defines a Federal action as "any action authorized, funded, or undertaken or proposed to be authorized, funded, or undertaken by a Federal agency." Because the COE proposes to issue permits that may affect listed resources, it must consult under ESA section 7(a)(2) and MSA section 305(b)(2).

The proposed project will expand and maintain existing recreational lake access and boat moorage facilities. The actions to be authorized under this permit include: dredging three existing basins, extending two boat ramps, installing two new docks, replacing one dock, and planting riparian and aquatic vegetation (see Appendix A and B for site drawings). This project will occur in multiple phases over eight years (see Table 1).

Table 1. Construction timing schedule.

Project Year	Phase	Project Element	Project Element Quantity
1	I	Dredge downstream basin	4,700 cubic yards
1	I	Extend two (2) boat launch ramps	1,440 square feet
3	II	Replace existing float in downstream basin	1,008 square feet; 6 piles
3	II	Extend replaced float in downstream basin	580 square feet; 4 piles
3	II	Install new float in downstream basin	1,114 square feet; 4 piles
5	III	Dredge midstream basin	3,100 cubic yards
8	IV	Dredge upstream basin	9,000 cubic yards
8	IV	Install new moorage float in upstream basin	1,284 square feet; 8 piles

1.2.1 Dredging and Site Preparation Elements

The dredging and preparation elements consist of constructing an isolation barrier, de-watering the basin, isolating and removing fish, dredging, and re-watering the basin.

Barrier construction: The mouth of each basin will be blocked by an isolation barrier consisting of gravel bag modules (sandbags filled with one-quarter inch to three-inch diameter round native gravel). The barrier will be constructed to function as a gravity dam or levee. A 30 millimeter fabric membrane will be placed on the riverside of the barrier.

De-watering and fish removal: During de-watering a fish biologist will be on site to assist in any fish removal to ensure compliance with appropriate fish removal standards[1]. Each basin will be de-watered with screened pumps[2] to an upland infiltration location. As the water lowers, seines will be used to herd fish. Once the water is low and confined the fish will be removed by hand, dip nets, or electro-fishing equipment (only if water temperatures are less than 18 degrees Celsius), placed in buckets, and released downstream of the project area. Additionally, the de-watering will occur when water temperatures exceed 15 degrees Celsius and between July 15 and September 30. A monitoring report will be prepared upon completion of fish removal, see Appendix C (*NOAA Fisheries In-Water Construction Monitoring Report Form*).

Dredging: Each of the three basins will be dredged down to 699 feet above mean sea level, removing a total of 16,800 cubic yards of soil. This soil will be excavated with a bulldozer and loader and placed in an upland disposal site. The removed soil will remain on-site or be used off-site for other construction purposes. The dredging and construction will occur after the barrier is in place and will be completed prior to February 28 of each year.

Re-watering: Upon completion of dredging, the basin will be filled with water. Once the sediment has returned to normal ambient conditions, determined by an electronic turbidity meter, the barrier will be removed.

1.2.2 Overwater Structures

The applicant will construct three new floating docks and retain two existing docks. All docks will have a main walkway with fingers protruding to one or both sides and be completely grated, including a minimum of 50% functional grating[3]. Each float will be located at least 20 feet perpendicular from the shoreline at ordinary high water, which is about 707 feet above sea level. All grating will have an open area[4] of at least 60%. The floats will remain at least three feet above the lake bed at all times. All piles will be smaller than 8 inches in diameter and colored white or encased in white polyvinylchloride (PVC) sleeves.

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[1]National Marine Fisheries Service, *Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act* (June 2000) (http://www.nwr.noaa.gov/1salmon/salmesa/4ddocs/final4d/electro2000.pdf).

[2]National Marine Fisheries Service, *Juvenile Fish Screen Criteria* (revised February 16, 1995) and *Addendum: Juvenile Fish Screen Criteria for Pump Intakes* (May 9, 1996) (guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm).

[3]Functional grating is the grating directly positioned over water with no obstructions. Allowing nearly 100% light passage.

[4]The percent open area is a relative measure of the degree to which light can pass through grating. The manufacturer may provide this value. Otherwise it can be calculated by dividing the opening size of the sum of the opening size plus the surface area of the rectangular bars and cross rods.

Upstream basin: The upstream basin will include one 1,284 square foot dock. The dock will consist of a ramp and float with eight piles.
Midstream basin: No new overwater structures will be built in the midstream basin. Two concrete overwater structures, with a combined surface area of 6,260 square feet and a total of 17 piles, will remain

Downstream basin: The proposed projects in the downstream basin include building one new dock and replacing one existing dock. The new dock will cover 1,114 square feet and include four piles. It will be located adjacent to the boat launch ramp. The existing concrete dock covering 1,130 square feet with 10 piles, will be replaced by a new 1,588 square foot dock with 10 piles.

1.2.3 Boat Launch Ramps

The proposed project will lengthen two existing boat launch ramps located in the downstream basin. The ramps will be extended 40 feet waterward of their present location. All boat launch demolition and construction will occur after the isolation barrier is in place and the basin has been de-watered. The ramps will be constructed of 8-inch thick concrete panels placed over a gravel bedding approximately 12 inches thick. The volume of gravel bedding is approximately 54 cubic yards and the volume of the concrete panels is approximately 36 cubic yards.

One boat ramp will be only partially replaced and the slope will be reduced from approximately 18.75% to approximately 13%, in order to match the adjacent ramp. This will involve demolishing approximately 1,000 square feet of the old boat ramp, excavating 55 cubic yards below the ordinary high water line (OHWL), placing approximately 18 cubic yards of rock or gravel bedding, and then installing a new concrete ramp. Upland of the OHWL both ramps will be extended approximately 50 feet inshore from the present top of the ramp.

1.2.4 Vegetation Enhancement

The proposed project includes measure to enhance riparian and aquatic habitats to minimize the effects of the action. The total area of riparian enhancement above the OHWL is 7,000 square feet. The total area of aquatic habitat enhancement below the OHWL is 15,118 square feet.

Riparian enhancement: The riparian enhancement component is approximately 7,000 square feet of new plantings in 35 planting plots each 10 feet long by 20 feet wide. Each plot will be planted with a minimum of two trees and 15 shrubs. All of the riparian plants will consist of large, native, minimum 24-inch to 36-inch, bare root nursery or container stock, except for black cottonwood trees which shall be a minimum of four to six feet tall.

Aquatic enhancement: The aquatic enhancement component covers approximately 15,118 square feet and includes the following species; pondweed (*Potamogeton sp.*), tulie (*Scirpus sp.*), and watershield (*Brasenia sp.*). The vegetation will be planted in all three basins after dredging has

been completed. Native riparian vegetation and some aquatic vegetation will remain. Eurasian milfoil will be removed to the greatest extent possible and a plan for minimizing the spread of milfoil will be implemented. The plan includes installing a catch basin and collection station for milfoil fragments at the boat launch and educational signs onshore.

Performance standards: Any planted trees, shrubs, and aquatic plants that die in the first two years will be replaced. During the third through fifth years after planting, 80% survival is targeted and plants that die will be replaced to maintain the 80% survival level. Individual plants that die or missing plants will be replaced with similar type and species of plant by qualified landscape professionals. All enhancement components will remain for the life of the project.

Monitoring procedures: Riparian and aquatic enhancement areas will be monitored on an annual basis. A written report will be provided to the COE within 60 days of installation. Monitoring will begin the first year after vegetation has been planted and continue for five years after each unit has been completed. All reports are to be accompanied by photo documentation taken from consistent locations, showing all enhancement areas.

1.3 Description of the Action Area

An action area is defined by the Services' regulations (50 CFR Part 402) as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The action area affected by the proposed action starts at the Rocky Reach Dam at river mile (RM) 473.7 and extends upstream to Wells Dam at RM 515.8. This area serves as a rearing, holding, and migratory corridor for juvenile and adult Upper Columbia River (UCR) Spring-run chinook salmon and UCR steelhead listed in Table 2. It also serves as EFH for chinook and coho salmon.

2.0 ENDANGERED SPECIES ACT

The objective of this Opinion is to determine whether the Lake Entiat Estates Marina Project, when added to the effects of the baseline, is likely to jeopardize the continued existence of the UCR Spring-run chinook salmon (*Oncorhynchus tshawytscha*) and/or Upper Columbia River steelhead (*O. mykiss*). Because critical habitat is not designated for these species, the analysis for destruction or adverse modification of critical habitat is not presented.

2.1 Biological Opinion

2.1.1 Evaluating the Effects of the Proposed Action

The prohibition of jeopardy is set forth in section 7(a)(2) of the ESA. The standard for determining jeopardy is found at 50 CFR 404.02. In conducting a jeopardy analyses under section 7 of the ESA, NOAA Fisheries uses the following steps, (1) consider the biological requirements and status of the listed species; (2) evaluate the relevance of the environmental

baseline to the species' current status; (3) determine the effects of the proposed or continuing action on the species, and whether the action is consistent with any available recovery strategy; and (4) determine whether the species can be expected to survive with an adequate potential for recovery when the effects of the proposed or continuing action are added to the effects of the environmental baseline, along with any cumulative effects. The analysis must consider measures for survival and recovery. If jeopardy is found, NOAA Fisheries must identify reasonable and prudent alternatives for the action that avoid jeopardy, if any.

The jeopardy analysis examines the proposed action's effects on the species' biological requirements in that area (*i.e.*, effects on habitat) as well as on the species itself. The analysis describes the action's effects on individual fish, populations, or both, and places those effects in the context of the Evolutionarily Significant Unit (ESU) as a whole. An ESU is a distinct population segment that is important to preserve in order to maintain the genetic diversity or spatial distribution of a species, and that can be identified for protection under the ESA. 16 U.S.C. 1532 (16).

2.1.1.1 Biological Requirements

The first step NOAA Fisheries uses when applying ESA section 7(a)(2) is to define the biological requirements of the listed ESUs affected by the action. Biological requirements are those conditions necessary for the listed ESUs to survive and recover to such naturally-reproducing population sizes that protection under the ESA would become unnecessary. To be delisted, species or ESUs populations must have the following attributes: sufficient numbers and distribution to maintain genetic diversity and heterogeneity, the ability to adapt to and survive environmental variation, and spatial and structural diversity sufficient to ensure long-term, self-sustaining persistence in the natural environment.

The UCR Spring-run chinook and UCR steelhead share similar basic biological requirements. These requirements include sufficient food, adequate flowing water (quantity), high quality water (cool, free of pollutants, high dissolved oxygen concentrations, low sediment content), clean spawning substrate, and unimpeded migratory access to and from spawning and rearing areas (adapted from Spence *et al.* 1996). The specific biological requirements affected by the proposed action include water quality, food, and unimpeded migratory access.

2.1.1.2 Status and Generalized Life History of Listed Species

Next, NOAA Fisheries considers the current status of the listed species, taking into account population size, trends, distribution, and genetic diversity starting with the determinations made in its decision to list the species. NOAA Fisheries also considers any new data that are relevant to the species' status.

Table 2. References for additional background on listing status, critical habitat designation, protective regulations, and life history for the ESA-listed species considered in this consultation.

Species	Listing Status	Critical Habitat	Protective Regulations	Biological Information
Upper Columbia River Spring-run chinook salmon	March 24, 1999; 64 FR 14308, Endangered	Not Designated[5]	July 10, 2000; 65 FR 42422	Myers *et al.*1998; Healey 1991
Upper Columbia River steelhead	August 18, 1997; 62 FR 43937, Endangered	Not Designated	July 10, 2000; 65 FR 42422	Busby *et al.*1995; 1996

Upper Columbia River Spring-run Chinook Salmon

The UCR Spring-run chinook salmon ESU, listed as endangered on March 24, 1999 (64 FR 14308), includes all natural-origin, stream-type chinook salmon from river reaches above Rock Island Dam and downstream of Chief Joseph Dam, including the Wenatchee, Entiat, and Methow River basins. All chinook in the Okanogan River are ocean-type and are considered part of the UCR summer- and fall-run ESU. The spring-run components of the following hatchery stocks are also listed: Chiwawa, Methow, Twisp, Chewuch, and White rivers and Nason Creek. The UCR Spring-run chinook salmon migrate and rear in the action area and are present during their smolt and adult migrations. Critical habitat is not currently designated for UCR Spring-run chinook, although a designation may be forthcoming (see footnote 5).

Life History (Including Ocean).

The UCR Spring-run chinook salmon exhibit classic stream-type life-history strategies: emigrating from freshwater as yearling smolts and undertaking extensive offshore ocean migrations. The majority of these fish mature at four years of age and return to the Columbia River from March through mid-May.

Population Trends and Risks.

On April 4, 2002, NOAA Fisheries defined interim abundance recovery targets for each spawning aggregation in this ESU. These numbers are intended to be an interim surrogate for the number and productivity of naturally produced spawners that may be needed for recovery, in the context of whatever take or mortality is occurring. They should not be considered in isolation, as they represent the numbers that, taken together, may be needed for the population to be self-sustaining in its natural ecosystem. For UCR Spring-run chinook salmon, the interim recovery levels are

[5]Under development. On April 30, 2002, the U.S. District Court for the District of Columbia approved a NOAA Fisheries consent decree withdrawing a February 2000 critical habitat designation for this and 18 other ESUs.

3,750 spawners in the Wenatchee River, 500 spawners in the Entiat River, and 2,000 spawners in the Methow River.

All three of the existing UCR Spring-run chinook salmon populations have exhibited similar trends and patterns in abundance over the past 40 years. The 1998 status review (Myers *et al.* 1998) reported that long-term trends in abundance were generally negative, ranging from negative 5% to positive 1%. Analyses of the data series, updated to include 1996-2001 returns, indicate that those trends have continued. Based on redd count data series, spawning escapements for the Wenatchee, Entiat, and Methow rivers have declined an average of 5.6%, 4.8%, and 6.3% per year, respectively, since 1958. In the most recent 5-year geometric mean (1997-2001), spawning escapements were 273 for the Wenatchee population, 65 for the Entiat population, and 282 for the Methow population, only 8% to 15% of the interim abundance recovery targets, although escapement increased substantially in 2000 and 2001 in all three river systems. Based on 1980-2000 returns, the average annual growth rate for this ESU is estimated as 0.85 (a growth rate of less than 1.0 is non-viable). Assuming that population growth rates were to continue at 1980-2000 levels, UCR Spring-run chinook salmon populations are projected to have very high probabilities of decline within 50 years (87% to 100%), and the ESU is likely to go extinct.

Upper Columbia River Steelhead

The UCR steelhead ESU, listed as endangered on August 18, 1997 (62 FR 43937), includes all natural-origin populations of steelhead in the Columbia River basin upstream from the Yakima River in Washington to the U.S./Canada border. The Wells Hatchery stock is included among the listed populations. NOAA Fisheries has initially identified three important spawning populations within this ESU: the Wenatchee, Entiat, and Methow populations (Interior Technical Recovery Team 2003). The UCR steelhead migrate and rear in the action area and are present during their smolt and adult migrations. Critical habitat is not presently designated for UCR steelhead, although a designation may be forthcoming (see footnote 5).

Life History.

Life history characteristics for UCR steelhead are similar to those of other inland steelhead ESUs; however, smolt age is dominated by two- and three-year-olds and some of the oldest smolt ages for steelhead, up to seven years, are reported from this ESU (Peven 1990). Based on limited data, steelhead from the Wenatchee and Entiat rivers return to freshwater after one year in salt water, whereas Methow River steelhead primarily return after two years in salt water. Similar to other inland Columbia River basin steelhead ESUs, adults typically return to the Columbia River between May and October and are considered summer-run steelhead. Adults may remain in freshwater up to a year before spawning. Unlike chinook salmon or sockeye salmon, a fraction of steelhead adults attempt to migrate back to the ocean. These fish are known as kelts, and those that survive will migrate from the ocean to their natal stream to spawn again.

Population Trends and Risks.

On April 4, 2002, NOAA Fisheries defined interim abundance targets for spawning populations that comprise this ESU and a composite productivity objective for the ESU (Lohn 2002). The productivity target is a geometric mean natural return rate of 1.0 or greater over a sufficient length of time to ensure survival and recovery of the ESU. The interim abundance targets are 2,500 spawners in the Wenatchee Subbasin, 500 spawners in the Entiat Subbasin, and 2,500 spawners in the Methow Subbasin. NOAA Fisheries developed these interim targets to help subbasin and recovery planners understand the approximate scale of improvement that will likely be needed to recover this ESU. NOAA Fisheries expects that these targets will change as better information is developed through these planning efforts.

Returns of both hatchery and naturally produced steelhead to the Upper Columbia River have increased in recent years. The average 1997-2001 return counted through the Priest Rapids fish ladder was approximately 12,900 fish. The average for the previous five years (1992-1996) was 7,800 fish. Abundance estimates of returning naturally produced UCR steelhead have been based on extrapolations from mainstem dam counts and associated sampling information (*e.g.*, hatchery/wild fraction, age composition). The natural component of the annual steelhead run over Priest Rapids Dam increased from an average of 1,040 (1992-1996), representing about 10% of the total adult count, to 2,200 (1997-2001), representing about 17% of the adult count during this period of time (West Coast Salmon BRT 2003).

In terms of natural production, recent population abundances for both the Wenatchee and Entiat aggregate population and the Methow population remain well below the interim recovery levels developed for these populations (West Coast Salmon BRT 2003). A 5-year geometric mean (1997-2001) of approximately 900 naturally produced steelhead returned to the Wenatchee and Entiat rivers (combined) compared to a combined abundance target of 3,000 fish. Although this is well below the interim recovery target, it represents an improvement over the past (an increasing trend of 3.4% per year). However, the average percentage of natural fish for the recent 5-year period dropped from 35% to 29%, compared to the previous status review. For the Methow population, the 5-year geometric mean of natural returns over Wells Dam was 358. Although this is well below the interim recovery target, it is an improvement over the recent past (an increasing trend of 5.9% per year). In addition, the 2001 return (1,380 naturally produced spawners) was the highest single annual return in the 25-year data series. However, the average percentage of wild origin spawners dropped from 19% for the period prior to the 1998 status review to 9% for the 1997 to 2001 returns.

2 .1.1.3 Environmental Baseline in the Action Area

The environmental baseline is defined as: "the past and present impacts of all Federal, state, or private actions and other human activities in the action area, including the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation and the impacts of state and private actions that are contemporaneous with the consultation in progress" (50 CFR 402.02). NOAA Fisheries' evaluates the relevance of the environmental baseline to the species' current status. In describing the environmental baseline, NOAA Fisheries evaluates the condition of essential features of critical habitat, if designated, and its ability to support the listed ESUs.

Generally, the environment for listed species in the Columbia River Basin (CRB), including those species that migrate past or spawn upstream from the action area, has been dramatically affected by the development and operation of the Federal Columbia River Power System (FCRPS). Storage dams, including the two that border the action area, have eliminated mainstem spawning and rearing habitat, and have altered the natural flow regime of the Columbia River, decreasing spring and summer flows, increasing fall and winter flow, and altering natural thermal patterns. Power operations cause fluctuation in flow levels and river elevations, affecting fish movement through reservoirs, disturbing riparian areas and possibly stranding fish in shallow areas as flows recede. The two dams that define the action area yield the same effect as the other seven dams in the migration corridor of the Columbia River, killing or injuring a portion of the smolts passing through the area. Above, below, and within the action area, the low velocity movement of water through the reservoirs behind the dams slows the smolts' journey to the ocean and enhances the survival of predatory fish (Independent Scientific Group 1996, National Research Council 1996). Similarly, within and outside of the action area, formerly complex mainstem habitats in the Columbia River have been reduced, for the most part, to single channels, with floodplains reduced in size, and off-channel habitats eliminated or disconnected from the main channel (Sedell and Froggatt 1984; Independent Scientific Group 1996; and Coutant 1999). The amount of large woody debris in the Columbia River has declined, reducing habitat complexity and altering the rivers' food webs (Maser and Sedell 1994).

Specifically, the action area consists of the impoundment of the Columbia River behind Rocky Reach Dam. The Rocky Reach Reservoir (Lake Entiat) extends 41 miles upstream to the tailrace of Wells Dam. Lake Entiat has a surface area of 8,167 acres, a volume of 431,500 acre-feet, an average depth of 42 feet, and a shoreline length of 93 miles. The Entiat and Chelan Rivers are the major tributaries flowing into the Reservoir. A broad river valley surrounds the dam and land use adjacent to the dam mainly includes apple orchards that line both sides of the Columbia River. There are also private residences, a residential subdivision, some commercial uses, and Lincoln Rock State Park. As part of its license to operate Rocky Reach Dam, Chelan Public Utility District was required to develop parks and recreation areas. State and Federally owned lands are also located in the vicinity of Rocky Reach Dam.

2.1.2 Analysis of Effects

Effects of the action are defined as "the direct and indirect effects of an action on the species, or critical habitat, together with the effects of other activities that are interrelated or interdependent with the action, that will be added to the environmental baseline" (50 CFR 402.02). Interdependent actions are those that have no independent utility apart from the action under consideration. Interrelated actions are those that are part of the larger action and depend on the larger action for their justification. (50 CFR 402.02)

The COE found that the Lake Entiat Estates Marina Project is likely to adversely affect the ESA-listed species identified in Table 2, based on the life history characteristics of these ESUs. The BE for the proposed action analyzes the effects of the proposed action on UCR Spring-run chinook salmon and UCR steelhead in the action area. The following analysis uses the best scientific and commercial data available to evaluate elements of the proposed action that have the potential to affect listed fish.

2.1.2.1 Direct Effects

Direct effects are the immediate effects of the project on the species or its habitat. Direct effects result from the agency action and include the effects of interrelated and interdependent actions. Future Federal actions that are not a direct effect of the action under consideration (and not included in the environmental baseline or treated as indirect effects) are not evaluated (USFWS and NMFS 1998).

Turbidity

The COE proposed to permit construction in and near the water, which can mobilize sediments and temporarily increase local turbidity levels in the Columbia River. In the immediate vicinity of construction (several meters), the level of turbidity would likely exceed natural background levels, which would adversely affect fish. Quantifying turbidity levels, and their effect on fish species is complicated by several factors. First, turbidity from an activity will typically decrease as distance from the activity increases. How quickly turbidity levels attenuate depends on the quantity of materials in suspension (*e.g.*, mass or volume), the particle size of suspended sediments, the amount and velocity of ambient water (dilution factor), and the physical/chemical properties of the sediments. Second, the impact of turbidity on fish is not only related to the turbidity levels, but also the particle size of the suspended sediments, the temperature of the water, and the lifestage of the fish.

For salmonids, turbidity has been linked to a number of behavioral and physiological responses (*i.e.*, gill flaring, coughing, avoidance, increase in blood sugar levels) which indicate some level of stress (Bisson and Bilby 1982; Sigler *et al.* 1984; Berg and Northcote 1985; Servizi and Martens 1992). The magnitude of these stress responses are generally higher when turbidity is increased and particle size decreased (Bisson and Bilby 1982; Servizi and Martens 1987; Gregory and Northcote 1993). Although turbidity may cause stress, Gregory and Northcote (1993) have

shown that moderate levels of turbidity (35-150 nephelometric turbidity units [NTUs]) accelerate foraging rates among juvenile chinook salmon, likely because of reduced vulnerability to predators (camouflaging effect).

The proposed action is expected to create short-term (a few hours) sediment pulses over a period of several weeks that are likely to be intense in the immediate vicinity of the project. Turbidity levels are expected to rapidly attenuate in a downstream direction and the turbidity plum is expected to be largely confined to the left bank of the Columbia River. Accordingly, free swimming adult and juvenile salmonids that might be irritated by the elevated turbidity levels should have no trouble finding local refuge. In addition, the COE will take measures to decrease the likelihood and extent of any such effect on listed salmonids; construction measures listed in section 1.2 are intended to minimize the amount of turbidity generated by the project, and should ensure that the turbidity levels remain below lethal or injurious levels.

Lost Benthic Habitat

The footprint of the proposed project will result in the loss of a maximum of 1,448 square feet of benthic habitat in the Columbia River. De-watering the basins also creates temporary loss (burial, dessication, and displacement) of macroinvertebrate habitat.

While juvenile salmonids are opportunistic predators that eat a wide variety of invertebrate species, generally feeding on drifting invertebrates in streams, they are known to also forage on epibenthic prey on the stream bottom. As aquatic invertebrates serve as an important source of prey for salmonids, and the loss of their habitat through burial, dessication, or displacement may reduce foraging opportunities for listed salmonids. Therefore, removal of benthic habitat could decrease feeding opportunities for juvenile salmonids, which must feed during their outmigration.

Fortunately, because aquatic invertebrates can recolonize disturbed locations quickly (Allan 1995) and adapt to new features in their environment, lost forage opportunity from the basin dredging is expected to be of short (several weeks) duration. Thus, given the relatively small footprint of the lost benthic habitat (1,448 square feet) relative to the total benthic habitat in the action area, and the fast invertebrate recolonization rate expected for the dredging (136,000 square feet), the replacement and enhancement of aquatic vegetation, and the relatively short time period of construction activities, effects of lost benthic habitat will affect only one season's outmigrating juvenile cohort.

Fish Removal and Handling

In each of the three basins, de-watering could result in the stranding of fry and juvenile salmonids. Additionally, the removal techniques and handling which are designed to limit how many fish are at risk of stranding, can themselves harm listed fish. The stranding risk associated with de-watering is expected to be reduced through the use of a gradual process of de-watering that will enable fish to be removed as the water pools and recedes. In addition, project timing should also limit the number of listed juvenile fish that are present in the area during de-watering. It is anticipated that there will be very few, if any, UCR steelhead or UCR Spring-run chinook salmon present in the basins during the de-watering process. The project design also incorporates seining, electro-fishing, and temperature limitations to help minimize the number of listed fish that will be exposed to de-watering.

Chemical Contaminants

As with all construction activities, accidental release of fuel, oil, and other petroleum based contaminants may occur. Spills of contaminants into waters of the state are unlawful, and these contaminants could injure or kill aquatic organisms if spilled into a water body or the adjacent riparian zone. Thus, the applicant has proposed fueling and maintenance of all equipment in designated staging areas away from the stream channel, and use of the construction measures listed in section 1.2, to ensure that the likelihood of such contamination is low. The attributes of the contaminant, the size of the spill, the time it takes to contain the spill, and the sensitivity of the fish lifestage present, each bear on the potential magnitude of the effect if a spill does occur.

2.1.2.2 Indirect Effects

Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Indirect effects may occur outside of the area directly affected by the action, and might include other Federal actions that have not undergone section 7 consultation but that will result from the action under consideration (interrelated or interdependent activities). These actions must be reasonably certain to occur, or be a logical extension of the proposed action.

Predation

The project includes measures, listed in section 1.2 (including grating and reflective dock components), to decrease the likelihood and extent of effects to listed salmonids.
To minimize the light/dark interface created by the overwater structures of the marina, the applicant will use conservative dock design criteria, such as surfacing 100% of the float, pier and ramp with grating to reduce the intensity of contrast in the light/dark interfaces relative to using opaque or other materials. Also, the float and pilings will be white, to reflect light, further reducing the light/dark interface over that of a standard design. However, using conservative dock design criteria does not eliminate the light/dark interfaces; it only reduces the area impacted (shaded) and/or degree of impact by dock structures over a standard design, by attempting to re-

create more natural light conditions. The applicant's design proposes a structure that creates an area of mostly low-light intensity, with some areas of stark light/dark contrast.

The extent of increase in predation on salmonids in the Columbia River resulting from overwater structures is not well known, but, in- and overwater structure, in several ways, benefit fish species that prey on juvenile salmonids. For example, Hoff (1991) documents increases of successful smallmouth bass nests of 183% to 443% and increases in catch/effort for fingerlings of 60% to 3,840% in Wisconsin lakes after the installation of half-log structures. He concluded that increasing nesting cover in lakes that have low nest densities, poor quality and/or quantity of nesting cover, and low first-year recruitment rates, can significantly increase recruitment of these piscivorous fish. Smallmouth bass have been observed to preferentially locate nest sites near artificial structures (Pflug and Pauley 1984; Hoff 1991). Literature and anecdotal evidence substantiate the use of docks and other structures by juvenile predators for rearing purposes. Juvenile predators may derive a survival advantage from use of these structures by avoiding predation by their larger conspecifics (Hoff 1991; Carrasquero 2001). The proposed action is likely to increase the amount of spawning and rearing habitat for predators, which could improve spawning success and lead to an overall increase in the predator population in the action area. Specifically, native (*e.g.*, northern pikeminnow (*Ptychocheilus oregonensis*)) and non-native (*e.g.*, smallmouth bass (*Micropterus dolomieu*), black crappie (*Pomoxis nigromaculatus*), white crappie (*Pomoxis. annularis*), and yellow perch (*Perca flavescens*)).

In- and overwater structure can also create conditions that increase predation success. The four major predatory strategies utilized by piscivorous fish are: prey pursuit, prey ambush, prey habituation to a non-aggressive illusion, or prey stalking (Hobson 1979). Ambush predation is probably the most commonly employed predation strategy. Predators lie-in-wait, then dart out at prey in an explosive rush (Gerking 1994). Oftentimes, predators use sheltered areas that provide velocity shadows to ambush prey fish in faster currents (Bell 1991). In addition to velocity shadows, shade plays an important role in predation success. Petersen and Gadomski (1994) found that predator success was higher at lower light intensities apparently because prey fish lose their ability to school at low light intensities, making them vulnerable to predation (Petersen and Gadomski 1994). While prey species are better able to see predators under high light intensity, providing the prey species with a relative advantage (Hobson 1979). Walters *et al.* (1991) indicate that high light intensities may result in increased use of shade-producing structures by predators. Similarly, Bell (1991) states that "light and shadow paths are utilized by predators advantageously."

The light/dark interface conditions (*i.e.,* shadows) of in- and overwater structure allow ambush predators to remain in darkened areas (barely visible to prey) and watch for prey to swim by against a bright background (high visibility). Prey species moving around structure(s) are unable to see predators in dark areas under or beside structure(s) thus are more susceptible to predation. Juvenile salmonids, especially ocean type chinook (among others), may utilize backwater areas during their outmigration (Parente and Smith 1981). The presence of predators may force smaller prey fish species into less desirable habitats, disrupting foraging behavior, and depressing growth (Dunsmoor *et al.* 1991). Bevelhimer (1996), in studies on smallmouth bass, indicates that

ambush cover and low light intensities create a predation advantage for predators and can also increase foraging efficiency. Ward (1992) found that stomachs of pikeminnow in developed areas of Portland Harbor contained 30% more salmonids than those in undeveloped areas, although undeveloped areas contained more pikeminnows.

While NOAA Fisheries is not aware of any studies to specifically determine impacts on listed salmonids of in- and overwater structures in the Columbia River system, the numerous analogous predation studies suggest that serious predation impacts arising from these structures could occur. The proposed action will add new in- and overwater structure, which may similarly benefit the native predators, such as northern pikeminnow, and the introduced predators such as smallmouth bass, black crappie, white crappie, and potentially, yellow perch (Ward *et al.* 1994; Poe *et al.* 1991; Beamesderfer and Rieman 1991; Rieman and Beamesderfer 1991; Petersen *et al.* 1990; Pflug and Pauley 1984; Collis *et al.* 1995) by providing nesting locations and cover for predators. Pilings provide nesting, spawning and hiding locations for predator species. The proposed 22 pilings to the action area will provide 22 velocity shadows of unknown size that expand and contract as discharge changes. These velocity shadow areas will likely be used by predators waiting to ambush migrating salmonid smolts.

In addition to piscivorous predation, in-water structures (tops of pilings) also provide perching platforms for avian predators such as double-crested cormorants (*Phalacrocorax auritis*) (Kahler *et al.* 2000), from which they can launch feeding forays or dry plumage. Placement of pilings to support the dock structures will potentially provide some usage by cormorants. To minimize the increase of predator advantage and its corollary effects to listed salmonids, the applicant will use conservative dock design criteria (grating and reflective materials, as identified above to reduce piscivor advantage), and placement of anti-perching devices on the top of the pilings to minimize the extent to which the dock conveys an advantage to avian predators.

Based on the presence of salmonids and native and non-native predators in the action area, and the additional shading and vertical structure created by the installation of new docks, it appears likely that the proposed action will contribute to increased predation rates on listed juvenile salmonids. By increasing the amount of suitable rearing and spawning habitat for predators, the proposed action which could increase the predator population in the action area, and increase the success of predators. Using the best available science, it is impractical at this time to quantify the number of listed salmonids that will be lost to predation as a consequence of the proposed action. When added to the environmental baseline, advantageous predator habitat created by this proposed action will likely result in only a minor increase in predation rates on listed salmonids, however salmon stocks with already low abundance are susceptible to further depression by predation (Larkin 1979). Decreased percentage of salmonid juvenile-to-adult survival is a function of increased predation rate on listed salmonids, which itself is a consequence of increased predator populations, as introduced artificial habitat (dock and pier structure) improves or increases spawning, rearing and ambush habitat for native and non-native predatory species.

Littoral Productivity

Docks can negatively affect littoral productivity, if the shade that docks creates inhibit the growth of aquatic macrophytes and other plant life (*e.g.*, epibenthic algae and pelagic phytoplankton). The proposed marina will add in- and overwater structure, but includes construction measures listed in section 1.2 (*i.e.*, grating and reflective dock components) to decrease the likelihood and extent of effects on listed salmonids. Surfacing 100% of the float deck, piers, and ramps with grating and using reflective materials for in-water components is expected to limit the amount and intensity of shade conditions beneath the proposed structures.

To the degree that natural light beneath the structure is reduced, the shade from docks can affect the overall productivity of littoral environments (Kahler *et al.* 2000). Aquatic plant life is the foundation for most aquatic food webs and their presence or absence affects many higher trophic levels (*e.g.*, invertebrates and fishes). Autochthonous pathways are of overriding importance in the trophic support of juvenile salmonids (Murphy 1991). In large rivers, autotrophs are more abundant nearer the shore (Naiman *et al.* 1980). Consequently, the shade from docks can affect local plant/animal community structure or species diversity. However, given the small footprint of the dock relative to the total surface area of littoral habitat in the action area, it is unlikely that a small amount of reduction in primary productivity will be sufficient to affect fish.

Boating Activity

Adding new docks may increase levels of boating activity in the reservoirs, especially near the docks. Although the type and extent of boating activity that might be enhanced by the proposed action are outside of the discretionary action under consultation here, boating activity might cause several impacts on listed salmonids and aquatic habitat. Engine noise, prop movement, and the physical presence of boat hulls may disturb or displace nearby fishes (Mueller 1980; Warrington 1999).

Boat traffic could also cause increased turbidity and up-rooting of aquatic plants in shallow waters, increased aquatic pollution (through exhaust, fuel spills, or release of petroleum lubricants), and increased shoreline erosion. These boating impacts indirectly affect listed fish in a number of ways. Turbidity may injure or stress affected fishes, as discussed above. The loss of aquatic macrophytes may expose salmonids to predation, decrease littoral productivity, or alter local species assemblages and trophic interactions. Despite a general lack of data specifically for salmonids, pollution from boats may cause short-term injury, physiological stress, decreased reproductive success, cancer, or death for fishes in general. Further, pollution may also impact fishes by impacts to potential prey species or aquatic vegetation. Shoreline erosion can change hydraulic flow patterns, increase sedimentation and turbidity, and reduce riparian vegetation, and steepen bank and nearshore gradient.

The new docks will cause a small increase in capacity and possibly use in the Rocky Reach Reservoir. This may lead to some increases in turbidity, up-rooting of aquatic plants, pollution, and shoreline erosion. These effects would be very difficult to measure, but would be expected to have only a negligible effect on listed salmonids.

2.1.2.3 Population-scale Effects

NOAA Fisheries has estimated the median population growth rate (lambda) for each species affected by this project. Under the environmental baseline, life history diversity has been limited by the influence of hatchery fish, by physical barriers that prevent migration to historical spawning and/or rearing areas, and by water temperature barriers that influence the timing of emergence, juvenile growth rates, or the timing of upstream or downstream migration. In addition, hydropower development has profoundly altered the riverine environment and those habitats vital to the survival and recovery of the ESUs that are the subject of this consultation.

Pacific salmon populations are also substantially affected by variations in the freshwater and marine environments. Ocean conditions are a key factor in the productivity of Pacific salmon populations. Stochastic events in freshwater (flooding, drought, snowpack conditions, volcanic eruptions, etc.) can play an important role in a species' survival and recovery, but those effects tend to be localized compared to the effects associated with the ocean. The survival and recovery of these species depends on their ability to persist through periods of low natural survival due to ocean conditions, climatic conditions, and other conditions outside the action area. Freshwater survival is particularly important during these periods because enough smolts must be produced so that a sufficient number of adults can survive to complete their oceanic migration, return to spawn, and perpetuate the species.

Specifically in the action area, the Lake Entiat Estates Marina Project is expected to add temporary, construction-related effects to the existing environmental baseline. Further, NOAA Fisheries believes that long-term, minor increases in predation rates and predator populations will occur as well. However, these effects are not expected to have any significance at the population level. Therefore, NOAA Fisheries believes that the proposed action does not contain measures that are likely to influence population trends of the affected ESUs.

2.1.3 Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." These activities within the action area also have the potential to adversely affect the listed species. Future Federal actions, including the ongoing operation of hydropower systems, hatcheries, fisheries, and land management activities are being reviewed through separate section 7 consultation processes. Federal actions that have already undergone section 7 consultations have been added to the description of the environmental baseline in the action area.

State, tribal, and local government actions will likely be in the form of legislation, administrative rules or policy initiatives. Government and private actions may include changes in land and water uses, including ownership and intensity, any of which could adversely affect listed species or their habitat. While specific government actions are subject to political, legislative, and fiscal uncertainties, changes in the economy have occurred in the last 15 years, and are likely to

continue, with less large-scale resource extraction, more targeted extraction, and significant growth in other economic sectors. Growth in new businesses, primarily in the technology sector, is creating urbanization pressures and increased demands for buildable land, electricity, water supplies, waste-disposal sites, and other infrastructure.

Economic diversification has contributed to population growth and movement, and this trend is likely to continue. Such population trends will result in greater demands for electricity, water, and buildable land in the action area; will affect water quality directly and indirectly; and will increase the need for transportation, communication, and other infrastructure. The result of these economic and population demands will probably affect habitat features such as water quality and quantity, which are important to the survival and recovery of the listed species. The overall effect will likely be negative, unless carefully planned for and avoided or mitigated.

The state of Washington has various strategies and programs designed to improve the habitat of listed species and assist in recovery planning. Washington's 1998 Salmon Recovery Planning Act provided the framework for developing watershed restoration projects and established a funding mechanism for local habitat restoration projects. The Watershed Planning Act, also passed in 1998, encourages voluntary planning by local governments, citizens, and Tribes for water supply and use, water quality, and habitat at the Water Resource Inventory Area or multi-Water Resource Inventory Area level. Washington's Department of Fish and Wildlife and tribal comanagers have been implementing the Wild Stock Recovery Initiative since 1992. The comanagers are completing comprehensive species management plans that examine limiting factors and identify needed habitat activities. Water quality improvements will be proposed through development of Total Maximum Daily Loads (TMDLs). The state of Washington is under a court order to develop TMDL management plans on each of its 303(d) water-quality-listed streams. It has developed a schedule that is updated yearly; the schedule outlines the priority and timing of TMDL plan development. These efforts should help improve habitat for listed species. Washington state closed the mainstem Columbia River to new water rights appropriations in 1995, but lifted this moratorium in 2002. The state has proposed to mitigate the effects of new appropriation by purchasing or leasing replacement water when Columbia River flow targets are not met. The efficacy of this program is unknown at the present time.

Specifically, in the Columbia River above Rocky Reach Dam, agricultural activities are the main land use. Riparian buffers are not properly functioning, containing little woody vegetation. Although land use practices that would result in take of endangered species is prohibited by section 9 of the ESA, such actions do occur. NOAA Fisheries cannot conclude with certainty that any particular riparian habitat will be modified to such an extent that take will occur. Riparian habitat is essential to salmonids in providing and maintaining various stream characteristics such as; channel stabilization and morphology, leaf litter, and shade. However, given the patterns of riparian development in the action area and rapid human population growth of Douglas County (21.1% from 1990-2000, U.S. Census Bureau), it is reasonably certain that some riparian habitat will be impacted in the future by non-Federal activities.

2.1.4 Conclusion

NOAA Fisheries has reviewed the direct and indirect effects of the proposed action, along with cumulative effects, on the above listed species and their habitat. NOAA Fisheries evaluated these effects in light of existing conditions in the action area. The proposed action is likely to cause short-duration, adverse effects on listed salmonids through habitat modification from the effects of construction activities. In addition, the proposed action is likely to cause long-term adverse effects on listed salmon by enabling increased predation. However, as discussed in section 2.1.2, these effects are unlikely to reduce salmonid distribution, reproduction, or numbers in any meaningful way. Therefore, the proposed action is not likely to jeopardize the continued existence of either listed UCR Spring-run chinook salmon or UCR steelhead.

2.1.5 Conservation Recommendations

Conservation recommendations are defined as "discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or regarding the development of information" (50 CFR 402.02). Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of threatened and endangered species. The conservation measures listed below are consistent with these obligations, and therefore should be implemented by the COE:

> The COE should evaluate the extent to which overwater structures, specifically docks and in-water structures, are being used by piscine predators for spawning, rearing, and predation on listed fish.
>
> The COE should determine how many docks could potentially be built in the Upper Columbia River between Rock Island Dam and Chief Joseph Dam and assess the cumulative effects of docks and marinas in the Columbia River.

In order for NOAA Fisheries to be kept informed of actions minimizing or avoiding adverse effects, or those that benefit listed species, NOAA Fisheries requests notification of the achievement of any conservation recommendation when the COE submits its monitoring report describing action under this Opinion or when the project is completed.

2.1.6 Reinitiation of Consultation

As provided in 50 CFR 402.16, reinitiation of formal consultation is required if: (1) The amount or extent of taking specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; (2) new information reveals effects of the action may affect listed species in a way not previously considered; (3) the action is modified in a way that causes an effect on listed species that was not previously considered; or (4) a new species is listed that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease, pending conclusion of the reinitiated consultation.

2.2 Incidental Take Statement

The ESA at section 9 (16 U.S.C. 1538) prohibits take of endangered species. The prohibition of take is extended to threatened anadromous salmonids by section 4(d) rule (50 CFR 223.203). Take is defined by the statute as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (16 U.S.C. 1532(19)). Harm is defined by regulation as "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavior patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering" (50 CFR 222.102). Harass is defined as "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering" (50 CFR 17.3). Incidental take is defined as "takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant" (50 CFR 402.02). The ESA at section 7(o)(2) removes the prohibition from any incidental taking that is in compliance with the terms and conditions specified in a section 7(b)(4) incidental take statement (16 U.S.C. 1536).

An incidental take statement specifies the impact of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency, the applicant, or both, must comply in order to implement the reasonable and prudent measures.

2.2.1 Amount or Extent of Take Anticipated

The UCR Spring-run chinook salmon and UCR steelhead use the action area for migration and rearing. UCR Spring-run chinook and UCR steelhead are likely to be present in the action area during part of the year such that they will likely encounter some of the effects of the proposed action. Therefore, incidental take of these listed fish is reasonably certain to occur. The proposed action does include measures to reduce the likelihood and amount of incidental take. To ensure the action agency and/or its applicant will implement these measures, take minimization measures included as part of the proposed action are restated in the Terms and Conditions provided below.

Take caused by the proposed action is likely in the form of "harm." Harm is likely to result from increased turbidity during of the construction of the proposed marina. Furthermore, marina construction will harm fish creating predator habitat enhancing existing predation opportunity. The amount or extent of take is difficult, if not impossible to estimate because the numbers of anadromous fish in any given area, and the extent to which they are effected by a proposed action is highly variable over time, and is not susceptible to numeric derivation. In instances where the number of individual animals to be taken cannot be reasonably estimated, NOAA Fisheries uses a surrogate approach, quantifying the extent of habitat affected. Quantifying take in this way provides obvious thresholds of anticipated take which, if exceeded, provide a basis for reinitiating consultation.

This Opinion analyzes the extent of effects that will result from adding a marina in the Rocky Reach Reservoir. The total overwater structure is 3,986 square feet. There will also be 22 in-water pilings with a maximum diameter of 8 inches. The pilings and boat launch ramps will reduce 1,448 square feet of benthic habitat. The applicant will dredge approximately 136,000 square feet and de-water three basins encompassing about 3 acres of habitat. Because NOAA Fisheries cannot estimate the number of fish that will be injured or killed by these occurrences, the extent of take anticipated in this statement is that which would accrue from the addition of the 22 pilings, 3,986 square feet of overwater structure, removing 1,448 square feet of benthic habitat, dredging 136,000 square feet, and de-watering about 3 acres. Should any of these habitat-alteration thresholds be exceeded during project activities, the reinitiation provisions of this Opinion would apply.

2.2.2 Reasonable and Prudent Measures

Reasonable and Prudent Measures are non-discretionary measures to minimize take, that may or may not already be part of the description of the proposed action. They must be implemented as binding conditions for the exemption in section 7(o)(2) to apply. The COE has the continuing duty to regulate the activities covered in this incidental take statement. If the COE fails to require the applicants to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, or fails to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. NOAA Fisheries believes that activities carried out in a manner consistent with these reasonable and prudent measures, except those otherwise identified, will not necessitate further site-specific consultation. Activities which do not comply with all relevant reasonable and prudent measures will require further consultation.

NOAA Fisheries believes that the following reasonable and prudent measures are necessary and appropriate to minimize take of listed fish resulting from implementation of the action:

1. The COE shall avoid or minimize incidental take from administration of the regulatory program for section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act of 1899, as covered in the proposed Lake Entiat Estates Marina Project .

2. The COE shall avoid or minimize incidental take from general construction.

3. The COE shall avoid or minimize incidental take from in- and overwater structures.

2.2.3 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the action must be implemented in compliance with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. To implement reasonable and prudent measure No. 1 the COE shall ensure:

a. Full implementation required. Departure from full implementation of the terms and conditions of the following incidental take statement will result in the lapse of the protective coverage of section 7(o)(2) regarding 'take' of listed species and may lead NOAA Fisheries to a different conclusion as to the effects of the continuing action, including findings that specific projects will jeopardize listed species.

b. Project access. Require landowners to provide reasonable access[6] to projects permitted under this Opinion for monitoring the use and effectiveness of permit conditions.

c. Salvage notice. Include the following notice with each permit issued, or in writing to each party that will supervise completion of the action.

NOTICE: If a sick, injured or dead specimen of a threatened or endangered species is found, the finder must notify the Northwest Office of NOAA Fisheries Law Enforcement at (206) 526-6133. The finder must take care in handling of sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder also has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed unnecessarily.

d. Vegetation enhancement projects. Ensure that the applicant or COE project successfully completes site restoration and vegetation enhancement for long-term adverse effects (if any) by requirement of the proposed enhancement activities.

(1) The vegetation enhancement area will include native shrubs (sitka willow (*Salix sitchensis*), scouler willow (*S. scouleriana*), sandbar willow (*S. exigua*), Mackenzie's willow (*S. prolixa*), Pacific willow (*S. lasiandra*), yellow willow (*S. lutea*), red osier dogwood (*Cornus stolonifera*)) and trees (black cottonwood (*Populus trichocarpa*) and Douglas fir (*Pseudotsuga menzieseii*)).

(2) Eighty percent survival of all planted trees and shrubs is required after planting the vegetation enhancement units. Individual plants that die must be replaced with native shrubs and trees taken from the species list above. All enhancement components will remain for the life of the project.

[6] 'Reasonable access' means with prior notice to the applicant, the Corps and NOAA Fisheries may at reasonable times and in a safe manner, enter and inspect permitted projects to ensure compliance with the reasonable and prudent measures, terms and conditions, in this Opinion.

Appropriate enhancement components will be planted by the following April 15 of the year after each project element has been completed.

(3) A vegetation enhancement planting and monitoring report will be due to NOAA Fisheries annually for five years from the date the vegetation is planted. The vegetation enhancement monitoring report will include written and photographic documentation on tree and shrub mortality and replanting efforts.

e. Reinitiate contact. To reinitiate consultation, contact the Habitat Conservation Division (Washington State Habitat Office) of NOAA Fisheries.

2. To implement reasonable and prudent measure No. 2 the COE shall ensure:

a. Minimum area. Confine construction impacts to the minimum area necessary to complete the project.

b. Timing of in-water work. Work below the bankfull elevation[7] will be completed between July 1 and February 28. Work cannot start until the temperature in the each basin is above 15 degrees Celsius.

c. Cessation of work. Cease project operations under high flow conditions that may result in inundation of the project area, except for efforts to avoid or minimize resource damage.

d. Pollution and Erosion Control Plan. Prepare and carry out a pollution and erosion control plan to prevent pollution caused by construction operations. The plan must be available for inspection on request by COE or NOAA Fisheries.

(1) Plan Contents. The pollution and erosion control plan will contain the pertinent elements listed below, and meet requirements of all applicable laws and regulations.

(i) The name and address of the party(s) responsible for accomplishment of the pollution and erosion control plan.

(ii) Practices to prevent erosion and sedimentation associated with access roads, stream crossings, drilling sites, construction sites, borrow pit operations, haul roads, equipment and material storage

[7] 'Bankfull elevation' means the height inundated by a 1.5 to 2-year average recurrence interval and may be estimated by morphological features such as average bank height, scour lines, and vegetation limits.

sites, fueling operations, staging areas, and roads being decommissioned.

(iii) Practices to confine, remove and dispose of excess concrete, cement, grout, and other mortars or bonding agents, including measures for washout facilities.

(iv) A description of any regulated or hazardous products or materials that will be used for the project, including procedures for inventory, storage, handling, and monitoring.

(v) A spill containment and control plan with notification procedures, specific cleanup and disposal instructions for different products, quick response containment and cleanup measures that will be available on the site, proposed methods for disposal of spilled materials, and employee training for spill containment.

(vi) Practices to prevent construction debris from dropping into any stream or water body, and to remove any material that does drop with a minimum disturbance to the streambed and water quality.

e. Piling installation. Install permanent pilings as follows.

(1) Minimize the number and diameter of pilings, as appropriate, without reducing structural integrity.

f. Treated wood.

(1) Projects using treated wood[8] that may contact flowing water or that will be placed over water where it will be exposed to mechanical abrasion or where leachate may enter flowing water are not authorized, except for pilings installed following NOAA Fisheries' guidelines.[9] Treated wood pilings must incorporate design features to minimize abrasion of the treated wood from vessels, floats, or other objects that may cause abrasion of the piling.

[8]'Treated wood' means lumber, pilings, and other wood products preserved with alkaline copper quaternary (ACQ), ammoniacal copper arsenate (ACA), ammoniacal copper zinc arsenate (ACZA), copper naphthenate, chromated copper arsenate (CCA), pentachlorophenol, or creosote.

[9]Letter from Steve Morris, National Marine Fisheries Service, to W.B. Paynter, Portland District, U.S. Army Corps of Engineers (December 9, 1998) (transmitting a document titled Position Document for the Use of Treated Wood in Areas within Oregon Occupied by Endangered Species Act Proposed and Listed Anadromous Fish Species, National Marine Fisheries Service, December 1998).

(2) Visually inspect treated wood before final placement to detect and replace wood with surface residues and/or bleeding of preservative.

g. Preconstruction activity. Complete the following actions before significant alteration of the project area.

(1) Marking. Flag the boundaries of clearing limits associated with site access and construction to prevent ground disturbance of critical riparian vegetation, wetlands and other sensitive sites beyond the flagged boundary.

(2) Emergency erosion controls. Ensure that the following materials for emergency erosion control are onsite.

(1) A supply of sediment control materials (*e.g.*, silt fence, straw bales[10]).

(3) Temporary erosion controls. All temporary erosion controls will be in place and appropriately installed downslope of project activity within the riparian area until site restoration is complete.

h. Heavy Equipment. Restrict use of heavy equipment as follows:

(1) Choice of equipment. When heavy equipment will be used, the equipment selected will have the least adverse effects on the environment (*e.g.*, minimally sized, low ground pressure equipment).

(2) Vehicle and material staging. Store construction materials, and fuel, operate, maintain and store vehicles as follows.

(i) To reduce the staging area and potential for contamination, ensure that only enough supplies and equipment to complete a specific job will be stored on-site.

(ii) Complete vehicle staging, cleaning, maintenance, refueling, and fuel storage in a vehicle staging area placed 150 feet or more from any stream, water body or wetland, unless otherwise approved in writing by NOAA Fisheries.

[10]When available, certified weed-free straw or hay bales will be used to prevent introduction of noxious weeds.

(iii) Inspect all vehicles operated within 150 feet of any stream, water body or wetland daily for fluid leaks before leaving the vehicle staging area. Repair any leaks detected in the vehicle staging area before the vehicle resumes operation. Document inspections in a record that is available for review on request by COE or NOAA Fisheries.

(iv) Before operations begin and as often as necessary during operation, steam clean all equipment that will be used below bankfull elevation until all visible external oil, grease, mud, and other visible contaminates are removed.

(v) Diaper all stationary power equipment (*e.g.*, generators, cranes, stationary drilling equipment) operated within 150 feet of any stream, waterbody or wetland to prevent leaks, unless suitable containment is provided to prevent potential spills from entering any stream or waterbody.

i. Site preparation. Conserve native materials for site restoration.

(1) If possible, leave native materials where they are found.

(2) If materials are moved, damaged or destroyed, replace them with a functional equivalent during site restoration.

(3) Stockpile any large wood, native vegetation, weed-free topsoil, and native channel material displaced by construction for use during site restoration.

j. Site restoration. Prepare and carry out a site restoration plan as necessary to ensure that all streambanks, soils and vegetation disturbed by the project are cleaned up and restored as follows. Make the written plan available for inspection on request by the COE or NOAA Fisheries.

(1) General considerations.

(i) Restoration goal. The goal of site restoration is renewal of habitat access, water quality, production of habitat elements (*e.g.*, large woody debris), channel conditions, flows, watershed conditions and other ecosystem processes that form and maintain productive fish habitats.

(ii) Streambank shaping. Restore damaged streambanks to a natural slope, pattern and profile suitable for establishment of permanent

woody vegetation, unless precluded by pre-project conditions (*e.g.*, a natural rock wall).

(iii) Revegetation. Replant each area requiring revegetation before the first April 15 following construction. Use a diverse assemblage of species native to the project area or region, including grasses, forbs, shrubs and trees. Noxious or invasive species may not be used.

(iv) Pesticides. Take of ESA-listed species caused by any aspect of pesticide use is not included in the exemption to the ESA take prohibitions provided by this incidental take statement. Pesticide use must be evaluated in an individual consultation, although mechanical or other methods may be used to control weeds and unwanted vegetation.

k. Capture and release. Before and intermittently during pumping to isolate an inwater work area, attempt to capture and release fish from the isolated area using trapping, seining, electrofishing, or other methods as are prudent to minimize risk of injury.

(1) The entire capture and release operation must be conducted or supervised by a fishery biologist experienced with work area isolation and competent to ensure the safe handling of all ESA-listed fish.

(2) Do not use electrofishing if water temperatures exceed 18 degrees Celsius.

(3) If electrofishing equipment is used to capture fish, comply with NOAA Fisheries' electrofishing guidelines.

(4) Handle ESA-listed fish with extreme care, keeping fish in water to the maximum extent possible during seining and transfer procedures to prevent the added stress of out-of-water handling.

(5) Transport fish in aerated buckets or tanks.

(6) Release fish into a safe release site as quickly as possible, and as near as possible to capture sites.

(7) Do not transfer ESA-listed fish to anyone except NOAA Fisheries personnel, unless otherwise approved in writing by NOAA Fisheries.

(8) Obtain all other Federal, state, and local permits necessary to conduct the capture and release activity.

(9) Allow NOAA Fisheries or its designated representative to accompany the capture team during the capture and release activity, and to inspect the team's capture and release records and facilities.

3. To implement reasonable and prudent measure No. 3 the COE shall ensure:

a. General Criteria. Dock and ramp structures permitted will comply with the following:

(1) Piscivorus bird deterrence. Fit all pilings, mooring buoys, and navigational aids (*e.g.*, channel markers) with devices to prevent perching by piscivorus birds.

(2) Flotation. Permanently encapsulate all synthetic flotation material to prevent breakup into small pieces and dispersal in water.

(3) New floats, ramps, and piers will be 100% grated, including a minimum of 50% functional grating.

3.0 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

3.1 Background

The MSA established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (section 305(b)(2));

- NOAA Fisheries must provide conservation recommendations for any Federal or State action that would adversely affect EFH (section 305(b)(4)(A));

- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NOAA Fisheries EFH conservation recommendations, the Federal agency must explain its reasons for not following the recommendations (section 305(b)(4)(B)).

The term "EFH" means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA section 3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.10). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

An EFH consultation with NOAA Fisheries is required regarding any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.

3.2 Identification of Essential Fish Habitat

Pursuant to the MSA the Pacific Fisheries Management Council (PFMC) has designated EFH for three species of Federally-managed Pacific salmon: chinook; coho (*O. kisutch*); and Puget Sound pink salmon (*O. gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (*i.e.*, natural waterfalls in existence for several hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of potential adverse effects to these species' EFH from the proposed action is based, in part, on this information.

3.3 Proposed Actions

The proposed action and action area are detailed above in section 1.2 and 1.3 of this document. The action area includes habitats that have been designated as EFH for various life-history stages of chinook and coho salmon.

3.4 Effects of Proposed Action

As described in detail in section 2.2 of this document, the proposed action may result in short- and long-term adverse effects to a variety of habitat parameters.

1. The proposed action will result in a temporary risk of contamination of waters through the accidental spill or leakage of petroleum products from heavy equipment.

2. The proposed action will result in a short-term degradation of water quality (turbidity) because of instream construction activities.

3. The proposed action will result in the long-term removal of 1,448 square feet of benthic habitat

4. The proposed action will add 62 cubic feet of in-water structure and 3,986 square feet of overwater structure that will likely contribute to a long-term increase in predation on coho and chinook, as well as long-term increases in freshwater exogenous material (non-native predators).

3.5 Conclusion

NOAA Fisheries concludes that the proposed action will adversely affect designated EFH for chinook and coho salmon.

3.6 Essential Fish Habitat Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies regarding actions which may adversely affect EFH. NOAA Fisheries understands that the conservation measures described in the BA will be implemented by the COE, and believes these measures are sufficient to minimize, to the maximum extent practicable, the following EFH effects; contamination of waters, suspended sediment, sound, benthic habitat removal, and predation. However, these conservation measures are not sufficient to fully address the remaining adverse affects to EFH. Consequently, NOAA Fisheries recommends that the COE implement the following conservation measures to minimize the potential adverse effects on EFH for chinook and coho:

1. To minimize EFH adverse affects No. 1 thru No. 4, the COE should:

    a. Confine construction impacts to the minimum area necessary to complete the project.

    b. Work below the bankfull elevation between July 1 and February 28. Work cannot start until the temperature in the each basin is above 15 degrees Celsius.

    c. Cease project operations under high flow conditions that may result in inundation of the project area, except for efforts to avoid or minimize resource damage.

    d. Prepare and carry out a pollution and erosion control plan to prevent pollution caused by construction operations. The plan should be available for inspection on request by COE or NOAA Fisheries, and include the components described in section 2.6.3(2)(d), above.

    e. Install permanent pilings using the minimum number and diameter of pilings, as appropriate, without reducing structural integrity.

    f. Exercise caution in the use of treated wood as described in section 2.6.3(2)(f), above.

    g. Complete Preconstruction Activity as described in section 2.6.3(2)(g), above.

    h. Restrict use of heavy equipment as follows as described in section 2.6.3(2)(h), above.

    i. In site preparation, conserve native materials for site restoration; if possible, leave native materials where they are found; if materials are moved, damaged or destroyed, replace them with a functional equivalent during site restoration; stockpile any large wood, native vegetation, weed-free topsoil, and native channel material displaced by construction for use during site restoration.

j. Prepare and carry out a site restoration plan as necessary to ensure that all streambanks, soils and vegetation disturbed by the project are cleaned up and restored as described at section 2.6.3(2)(l), and make the written plan available for inspection on request by the COE or NOAA Fisheries.

k. Before and intermittently during pumping to isolate an in-water work area, attempt to capture and release fish from the isolated area using trapping, seining, electrofishing, or other methods as are prudent to minimize risk of injury. The COE should follow steps 1-9, found at section 2.6.3(2)(k), above.

l. Piscivorus bird deterrence. Fit all pilings, mooring buoys, and navigational aids (*e.g.*, channel markers) with devices to prevent perching by piscivorus birds.

3.7 Statutory Response Requirement

Pursuant to the MSA (section 305(b)(4)(B)) and 50 CFR 600.920(k), Federal agencies are required to provide a detailed written response to NOAA Fisheries' EFH conservation recommendations within 30 days of receipt of these recommendations. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity on EFH. In the case of a response that is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

3.8 Supplemental Consultation

The COE must reinitiate EFH consultation with NOAA Fisheries if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920(l)).

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APPENDIX A
VICINITY MAP OF PROPOSED PROJECT